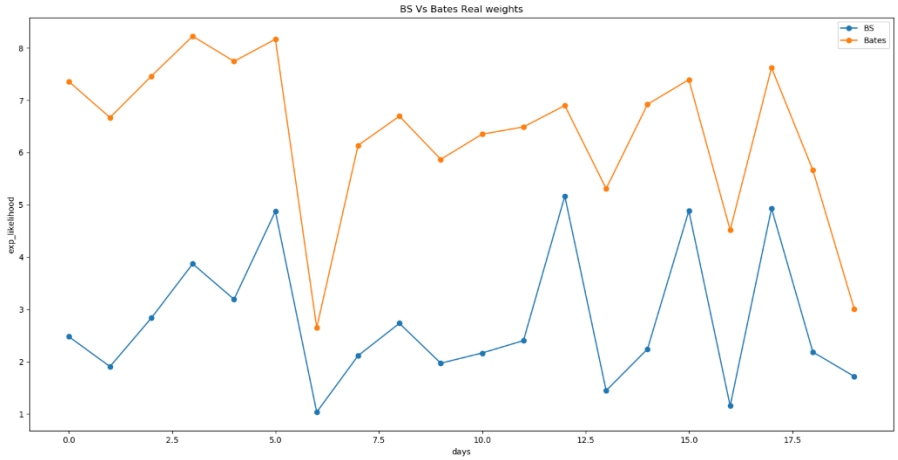
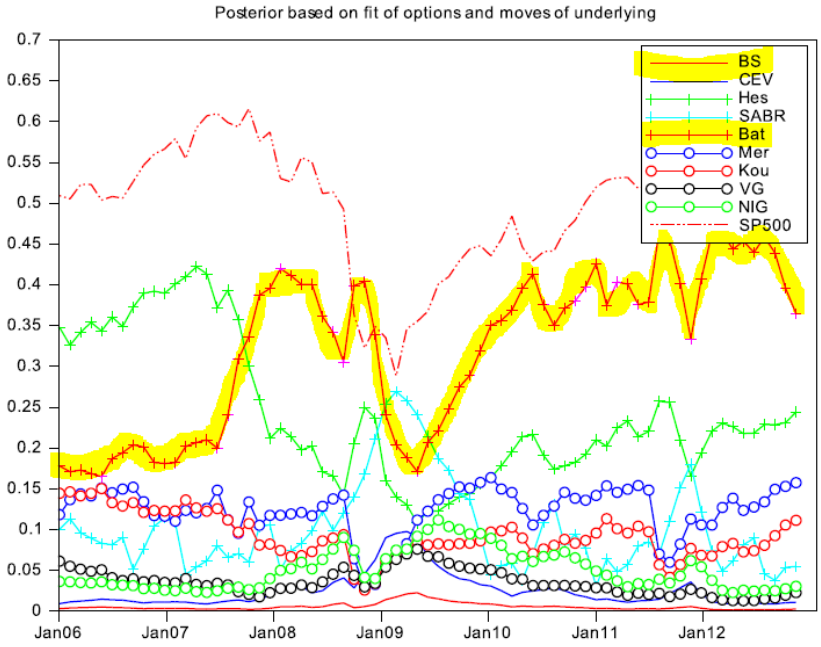
1). Replication:

As discussed, two models (BS and Bates) will be replicated by using Roger's method. I updated the penalty function and the result looks good. (Upper one: our replication, Lower: Rogers)

Please beware, the y-axis in our graph is the **likelihood** values, not the weight values, where rogers takes. However, I believe those two graphs are similar, regards to the likelihood weights of BS and Bates.

Therefore, we confirm that the labels (weight values) is reliable.



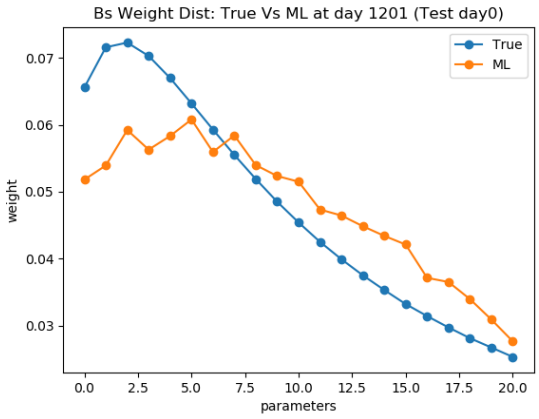



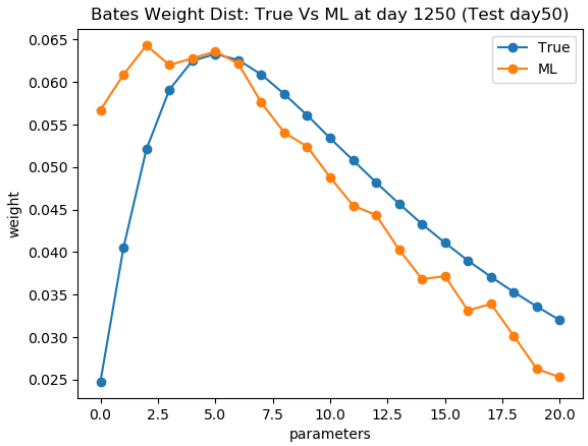
2) Deep Learning Result:

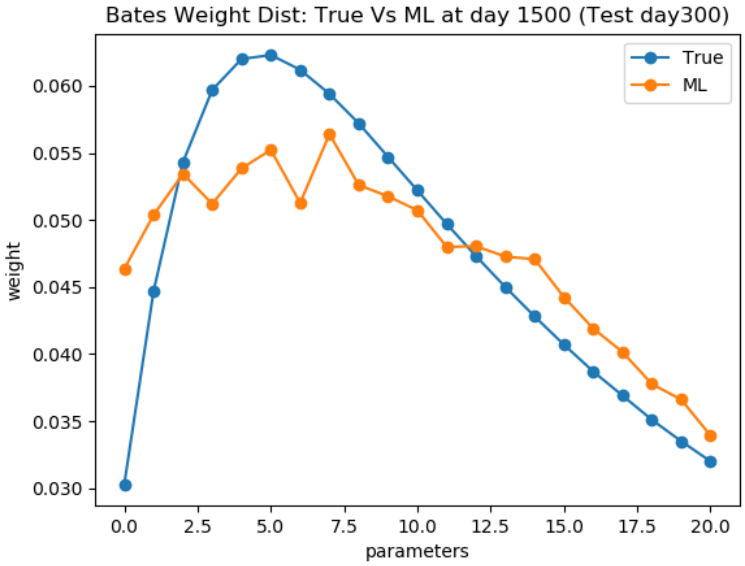
I will give more details about the inside structure of my programming. In terms of result, Matheus is correct, the deep learning can reduce a ton of time in the calibration process. The following graphs shows the real weight distribution and estimated values by Deep learning method.

Training Data: Day 0 to Day 1200, Test Data: Day 1201 to 1772, **All results are based on the test data day 1201, day 1250 and day 1500.**

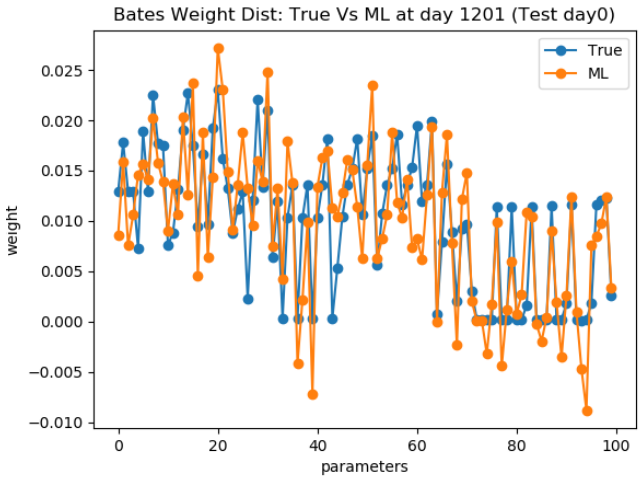
BS class (21 models)

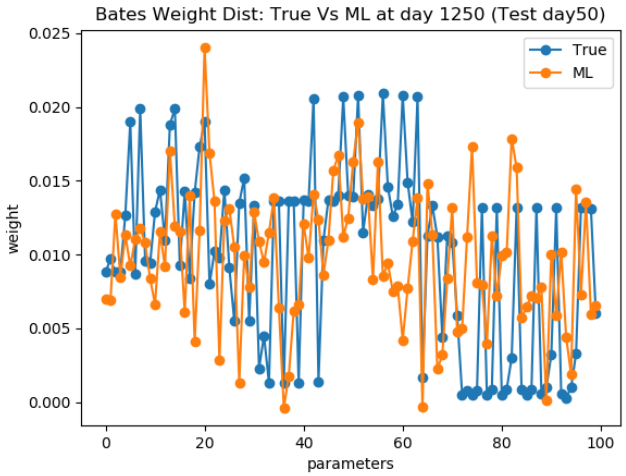


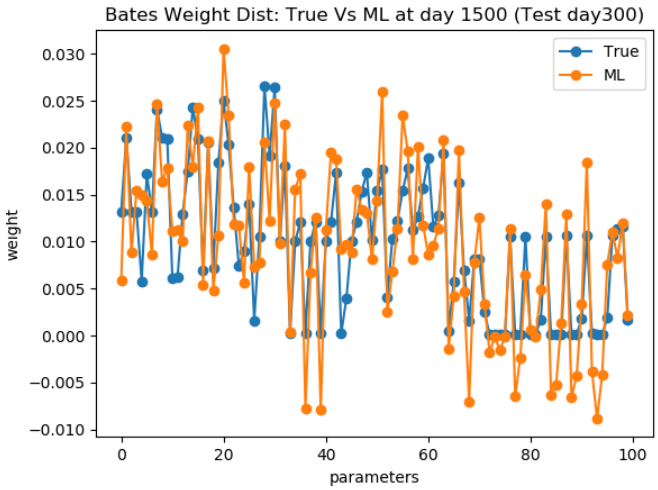






Bate class: (100 models)





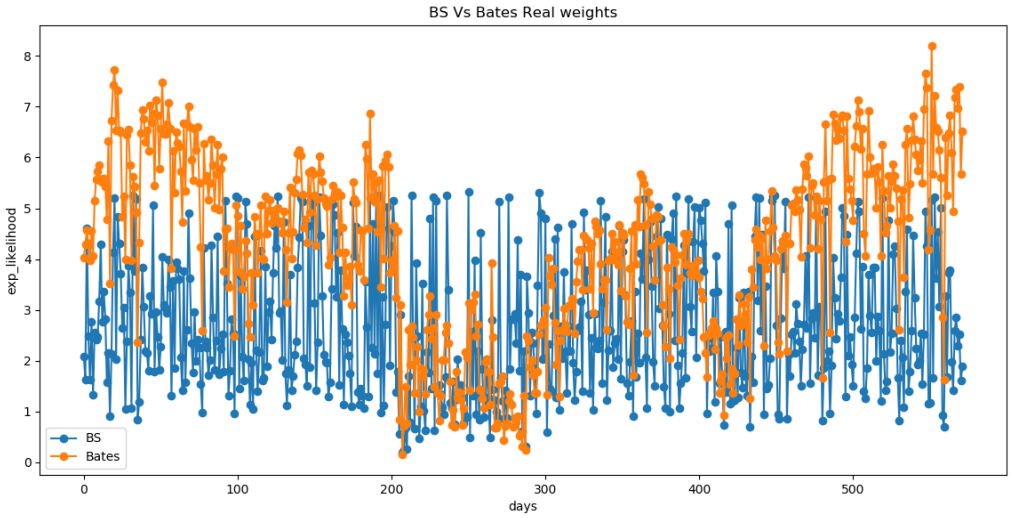

3) Overall comparison

I also compared the posterior of BS and Bates, by using deep methods and Rogers' method

The real value of Likelihood: (Rogers)

Y axis: exp(Likelihood)

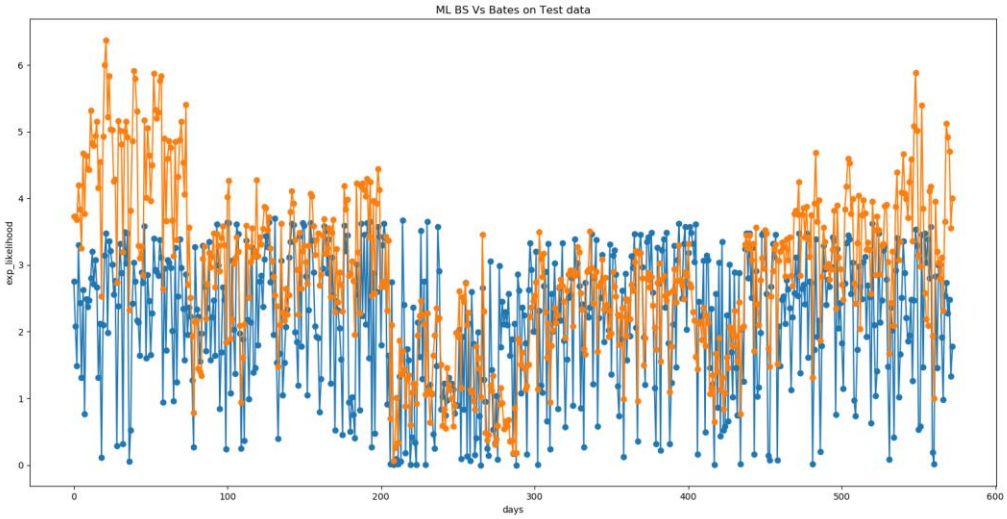
X axis: all test data set (day 1201 to 1773, test day 0 to 572)




likelihood values by Deep learning:

Y axis: exp(Likelihood)

X axis: all test data set (day 1201 to 1773, test day 0 to 572)




Conclusion & Plan:

1) The Deep learning works very well, but it still has a room to improve.
2) We need to do other families by September.
3) If time allows, we can try some more complicated models before November. I thought it may works better.